

Motoji TAGAWA *: *Pyrrosia* of Formosa

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The present paper is a taxonomic review on the 8 species of *Pyrrosia* hitherto recorded from Formosa ; they are :

1. *Pyrrosia linearifolia* (Hook.) Ching,
2. *Pyrrosia adnascens* (Sw.) Ching,
3. *Pyrrosia grandissima* (Hayata) Ching,
4. *Pyrrosia Sheareri* (Bak.) Ching,
5. *Pyrrosia lingua* (Thunb.) Farwell with *Cyclophorus lingua* var. *angustifrons* Hayata and var. *attenuata* Rosenst.,
6. *Cyclophorus taiwanensis* (Christ) C. Chr.,
7. *Pyrrosia polydactylis* (Hance) Ching,
8. *Pyrrosia subfissa* (Hayata) Ching,
9. *Pyrrosia transmorrisonensis* (Hayata) Ching,
10. *Cyclophorus Matsudai* Hayata.

Of these 10 species, *P. linearifolia* represents a new variety ; 3. *P. grandissima* is no more than 4. *P. Sheareri* ; 6. *C. taiwanensis* is nothing but 5. *P. lingua*, and *C. lingua* var. *angustifrons* and var. *attenuata* are not worthy of varietal recognition ; 8. *P. subfissa* may be identical with Chinese *P. gralla* ; and 9. *P. transmorrisonensis* and 10. *C. Matsudai* are apparently distinct. Thus the genus *Pyrrosia* is represented by 8 species in Formosa ; they may be distinguished as seen in the following key.

- 1 a. Sori arranged in one row on each side of the costa ; leaves linear, under 5 mm. wide.
.....(1) *P. linearifolia* var.
- 1 b. Sori multiseriate on each side of the costa ; leaves much broader.
- 2a. Leaves strongly dimorphic, the fertile linear-elongate, much longer than the sterile.
..... (2) *P. adnascens*
- 2b. Leaves monomorphic or nearly so.
- 3a. Hairs on the under side of lamina with narrowly lanceolate arms.
- 4a. Rhizome short-creeping ; leaves approximate, the lamina cordate or round-truncate and subauricled at the base.
.....(3) *P. Sheareri*
- 4b. Rhizome long-creeping ; leaves distant, the lamina acute, acuminate or obtuse at the base.(4) *P. lingua*
- 3b. Hairs on the under side of lamina with needle-like arms.
- 4a. Lamina palmately 5-9-parted.(5) *P. polydactylis*
- 4b. Lamina simple or hastately triparted.
- 5a. Leaves more or less distant, the lamina simple, sparsely stellato-pilose

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beneath.....(6) *P. gralla*

5b. Leaves approximate, the lamina simple or hastately triparted, densely stellato-tomentose beneath.

6a. Rhizome scales 2 mm. long, dark-brown or shining black, the margin densely fimbriate-ciliate.(7) *P. transmorrisonensis*

6b. Rhizome scales 3-4 mm. long, dark-brown, the margin denticulate or errose, very sparsely ciliate.....(3) *P. Matsudai*

(1) ***Pyrrosia linearifolia*** (Hook.) Ching, Bull. Chinese Bot. Soc. 1 : 48 (1935)

var. **typica**.—*Niphobolus linearifolius* Hook. 2nd Cent. Ferns t. 58 (1861), Type from Tsus Sima, Japan. Varietas squamis a basi lanceolata subulato-setaceis, rufo-brunneis, a medio sursum plus minusve reflexis.

Wide-spread in Japan, Korea and South Manchuria, but not found in the Mainland of China (c. f. Ching, l. c.). Plants from Formosa hitherto known as *Polypodium linearifolium* Hook., etc. are

var. **heterolepis** Tagawa, var. nov. Varietas squamis subulato-lanceolatis, pallidioribus, imbricatis, plerumque non reflexis a typo diversa.

Throughout the Island, rather rare, ascending to 2000 m alt., usually growing on mossy rocks or tree-trunks. Specimens examined : Prov. Sintiku : Gaogan, Simada 5122 (K**); Nansyô, Simada 106(K). Prov. Taityû : Mareppa, Musya, Inoue (K) ; along the pass over Mt. Nôkô, Ohwi 3377 (K). Prov. Takao : between Masuhoaru and Hinokidani, Kizan-gun, Okamoto (K) ; between Hôrai and Gani, Kizan-gun, Tagawa 1268 (K), Type. Prov. Kwarenkô : between Rokumei and Sampû, Tamazato-gun, Tagawa 3755 (K). Prov. Taitô : between Kaede and Kakayo, Kwanzan-gun, Tagawa 3264 (K) ; between Kakayo and Tôrin, Kwanzan-gun, Tagawa 3251 (K).

(2) ***Pyrrosia adnascens*** (Sw.) Ching, l. c. 45. cum syn.—*Polypodium adnascens* Sw. Syn. Fil. 25, 222, t. 2, f. 2 (1806), Type from Malabar, India.

Common throughout the Island, usually scandent on exposed tree-trunks or rocks in lowlying districts ; wide-spread in tropical Asia and Polynesia.

(3) ***Pyrrosia Sheareri*** (Bak.) Ching, l. c. 64 ; Tagawa, Acta Phytotax. Geobot. 6: 165 (1937). —*Polypodium Sheareri* Bak. Journ. Bot. 13 : 201. (1835), Type from Lu-shan, China.—*Cyclophorus grandissima* Hayata, Ic. Pl. Formos. 4 : 255. f. 179 (1914), Type from Arisan, Formosa.—*Pyrrosia grandissima* (Hayata) Ching, l. c. 63.

Throughout the Island, growing on mossy tree-trunks in thick forests of

** K and T indicate the Herbarium of the University of Kyoto and of the University of Tokyo respectively.

mountainous districts at 1000-3000 m alt. ; also wide-spread in China from the Yangtze valley southward, and in Tongking.

Ching has distinguished *P. grandissima* from *P. Sheareri* by the larger size and thicker texture of the frond, the distinct lateral main veins, and the longer arms of the stellate hairs. Comparing the typical *P. grandissima* with *P. Sheareri* from several localities in China, I conclude that *P. grandissima* is no more than a form of *P. Sheareri*, and that the distinctive characters recognized by Ching are not absolute (cf. Tagawa, l. c.). The typical *P. Sheareri* has also been recorded from Formosa by Ching (cl. Ching, l. c.).

(4) ***Pyrrosia lingua*** (Thunb.) Farwell; Ching, l. c. 60, cum syn.—*Acrostichum lingua* Thunb. Fl. Jap. 330. t. 33 (1784). Type from Nagasaki, Japan.—*Cyclophorus lingua* var. *angustifrons* Hayata, Ic. Pl. Formos. 5 : 264 (1915). Type from Arisan, Formosa. *C. lingua* var. *attenuata* Rosenst. Hedwigia 56 : 347 (1915). Type from Raisha, Formosa.—*Polypodium taiwanense* Christ in Warb. Mons. 1 : 60 (1900). Type from Keelung, Formosa.—*C. taiwanensis* (Christ) C. Chr. Ind. Fil. 201 (1905).

Common throughout the Island, ascending to about 2000 m alt., usually growing on exposed rocks or on mossy tree-trunks ; widespread in warmer districts of Japan and in Quelpart, in the mainland of Asia extending from the Yangtze valley southward to Riukiu, Formosa, Tongking and Annam.

Variability of this species has been fully discussed by Ching (cf. Ching, l. c. 62). *C. lingua* var. *angustifrons* represents a smaller form with linear fronds 10-12 cm long by 13 mm wide. *C. lingua* var. *attenuata* was characterized by “laminis sterilibus et fertilibus angustioribus, praesertim deorsum longe attenuatis”; the duplicate type of this variety in hand (in rupibus Raisha, Faurie 223) has narrowly lanceolate sterile lamina 9-10 cm long by 1.5 cm broad on stipe 3-4 cm long and the linear fertile fronds 13-15 cm long by 10-12 mm wide on stipe 5-7 cm long. *Polypodium taiwanense* was distinguished from *P. lingua* by “stipite (12 ad 20 cm) et fronde (12 ad 20 cm) elongatis, fronde lineari lanceolata, 2 cm lata, longe acuminata in stipitem sensim decurrente, venis lateralibus conspicuis, soris ab apice ad medium frondis descendentibus.” This is not much unlike var. *attenuata*. Giesenhagen is the first one who noticed the identity of *P. taiwanense* and *Niphobolus lingua* (cf. Gies. Niph. 158, 1901).

(5) ***Pyrrosia polydactylis*** (Hance) Ching, l. c. 48.—*Polypodium polydactylon* Hance, Journ. Bot. 21 : 269 (1883). Type from Tamsui, Formosa.

An endemic species, widely spread in mountainous districts with an elevation under 2000 m., rather common, growing on mossy rocks or tree-trunks.

(6) **Pyrrrosia gralla** (Gies.) Ching, l. c. 50. — *Niphobolus gralla* Gies. Niph. 128 (1901), Type from Me-lê district, Yunnan. — *Cyclophorus subfissus* Hayata, Ic. Pl. Formos. 5 : 264 (1915), Type from Arisan, Formosa. — *P. subfissa* (Hayata) Ching, l. c. 72.

Rhizome rather slender, about 2 mm thick, densely scaly ; scales imbricate, adpressed, ovate-acuminate, dark-brown or sometimes shining-black with pale-coloured margin, peltately affixed, ca. 2 mm long, rather sparsely short-fimbriate-ciliate on the margin, rigid in the texture. Stipe 3-5 mm apart, 3-10 cm long, stramineous, narrowly winged upwards, sparsely stellato-pillose ; lamina linear-lanceolate, gradually long-attenuate towards both ends, entire, acuminate, long-decurrent at the base, 10-30 cm long by 1-2 cm wide or sometimes narrower ; texture coriaceous ; upper surface nigro-punctate, at first sparsely clothed with whitish stellate hairs with very long, fine, needle-like arms, at length glabrescent ; under surface at first densely stellato-tomentose, at length sparsely so or becoming almost glabrous, the hairs uniform, pale reddish brown, with needle-like long arms ; costa prominent, the lateral main veins very oblique, obscure or sometimes more or less distinct beneath, the venation campyronoid. Sori roundish or oblong, superficial, very dense, but not confluent, usually covering the whole under surface of the upper half of the lamina.

Rather rare, usually growing on mossy tree-trunks in mountain forests at about 1500-2000 m alt. Specimens examined :

Prov. Taityû : Piyanan-ambu to Sikayô, Ohwi 2752 (K). Prov. Tainan : Hasegawa-Kei in the Arisan mountains, Itô (T), type of *G. subfissus*; Arisan 2500 m in rupibus, Faurie 653 (K); inter Numanohira et Tôzan in monte Arisan, Tagawa 372 (K). Prov. Takao : between Isiyama and Takimi, Kizan-gun, Tagawa 1870 (K) ; between Takimi and Hinokiyama, Kizan-gun, Tagawa 1874 (K). Prov. Taitô : between Kaimosu and Hariposon, Kwanzan-gun, Tagawa 3023 (K).

Originally described from Yunnan, and, also in Sechwan. *C. subfissus* from Formosa agrees well in important point with the original description of Chinese *P. gralla*.

(7) **Pyrrrosia transmorrisonensis** (Hayata) Ching, l. c. 72. — *Cyclophorus transmorrisonensis* Hayata, Ic. Pl. Formos. 4 : 256. f. 180 (1914), Type from Central Mountains of Formosa. — *Niphobolus fissus* Bl. sensu Hayata, Bot. Mag. Tokyo

23 : 34 (1909).

Rhizome rather short-creeping, to 3 mm thick, densely scaly ; scales imbricate, adpressed, dark-brown or shining-black, with rufous brown densely fimbriate-ciliate margin, rigid, in texture, lanceolate from an ovate peltately affixed base, ca. 2 mm long, long acuminate. Stipe approximate, 5-15 cm or sometimes to 20 cm long, narrowly winged upwards, clothed with persistent, pale-brown stellate hairs ; lamina lanceolate, oblanceolate or narrowly lanceolate, simple or sometimes hastately producing a short segment on one or on both sides at the base, 5-15 cm long by 1-3 cm broad, the apex acute or acuminate, or in the case of small leaves obtuse, the base acuminate, rather short-decurrent, the margin entire or broadly and shallowly repand ; texture coriaceous ; upper surface punctate, sparsely clothed with whitish hairs with very long fine needle-like arms, at length usually glabrous, under surface densely stellato-tomentose with persistent pale reddish brown uniform hairs with long needle-like arms ; costa distinct, the lateral main veins very oblique, obscure, the venation campyronoid. Sori roundish, superficial, not much dense, often occupying the whole under surface of the lamina.

Rare, growing on mossy tree-trunks or rocks in mountaneous districts at 500-1500 m alt. Specimens examined ;—

Montibus centralibus ad 10000 ped. alt., Mori 2363 (T), type. Prov. Kwarenkô : between Miharasi and Seraoka, Kwaren-gun, Tagawa 762 (K) ; between Ubô and Takimi, Kwaren-gun, Tagawa 3718 (K) ; between Kirai and Kirisato, Kwaren-gun, Tagawa 3718 (K) ; between Kirai and Kirisato, Kwaren-gun, Tagawa 3728 (K) between Rakura and Tôkatsu, Tamazato-gun, Tagawa 3259 (K).

Apparently a distinct species. Simple leaves of this species resemble much *P. mollis*, from which it is distinguished by the indumentum consisting of one kind of stellate hair with needlelike arms.

(8) ***Pyrrhosia Matsudai*** (Hayata) Tagawa, comb. nov.—*Cyclophorus Matsudai* Hayata, Ic. Pl. Formos. 10: 73. f. 48 (1921). Type from Tabogan-goe in Arikobanti, southern Formosa.

Rhizome short-creeping, 3-4 mm thick, densely scaly ; scales imbricate, adpressed, dark-brown, rigid, subulate-lanceolate from an ovate, peltately affixed base, long acuminate, 3-4 mm long, the margin denticulate or errose, very sparsely ciliate. Stipe aggregate, 3-15 cm long, sparsely stellato-pillose ; lamina simple, linear-lanceolate or linear, and gradually long attenuate towards both ends, 10-15 cm long by ca. 1 cm wide, or hastately triparted into linear lanceolate or lanceo-

late pinnae, the central one 6-12 cm long by 1-1.5 cm wide, the lateral ones erect-patent, 2-8 cm. long, the base cuneate and short-decurrent, the margin entire; texture coriaceous; upper surface punctate, sparsely clothed with whitish stellate hairs with very fine arms, at length glabrous; under surface densely tomentose with pale reddish brown, persistent hairs with long, needle-like arms; costa prominent, the lateral main veins very oblique, obscure, the venation campyronoid. Sori roundish, superficial, often very dense, but not confluent.

An endemic species, restricted to the southern districts, rare, growing on mossy rocks at about 500 m. alt. Specimens examined;—

Prov. Takao; Tabogan-goe in Ariko-banti, Matuda (T), Type; between Hôrai and Gani, Kizan-gun, Tagawa 1335, 1336 (K).

Apparently a distinct species, distinguished from *P. transmorrisonensis* by the characters of rhizome scales as seen in the key.

○博物館で出版した櫻の圖譜中ミネザクラに就て この図の材料は富士山, “須走口の一合目の馬返し”の横手の林の中で採つた。その樹は幹の径が2尺位の大木で、未だ蕾が開いていなかった。これを一抱え程採集して東京に送つた。東京は暖かなので、活けておいたらすぐ花が咲き始めた。山田壽雄君に頼んで、本郷駒込動坂町の自宅で画をかせたが、画いているうちに状態が変らぬ様に 部屋に氷を立てたりした。画料はたつた30円だつたが、当時としては相当の額であつた。今日は画料も高くなつて、このために植物の研究が支障を來しているのは残念である。

(牧野先生一夕話 IX—文責在編輯)